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Ecosystem Restoration Program - 2002 Proposal Solicitation Package (PSP): Form I – Project Information

1. Proposal Title:

West Coast Ballast Outreach Project

2. Proposal applicants:

Cassell, Jodi, University of California Sea Grant Extension Program
McDowell, Karen, University of California Sea Grant

3. Corresponding Contact Person:

First Name: Carol
Last Name: Berman
Organization: University of California, Division of Agriculture and Natural Resources
300 Lakeside Drive, 6th Floor, Oakland, CA 94612-3550
Phone: (510) 987-0050
Email: Carol.Berman@ucop.edu

4. Project Keywords:

Environmental Education
Local and Regional Coordination
Nonnative Invasive Species

5. Type of project:

Education

6. Does the project involve land acquisition, either in fee or through a conservation easement?

No

7. Topic Area:

Non-Native Invasive Species

8. Type of applicant:

University

9. Location - GIS coordinates:

Latitude:

Longitude:

Datum:

Describe project location using information such as water bodies, river miles, road intersections, landmarks, and size in acres.

This project is an education, outreach, and coordination project. The education efforts will be focused in the San Francisco Bay-Delta region, specifically targeting the commercial port areas. This project will also have a regional approach, incorporating the entire west coast of the United States. The regional approach is funded by the National Sea Grant College Program.

10. Location - Ecozone:

Code 15: Landscape

11. Location - County:

Alameda, Contra Costa, Marin, Sacramento, San Francisco, San Mateo, Santa Clara

12. Location - City:

Does your project fall within a city jurisdiction? No

13. Location - Tribal Lands:

Does your project fall on or adjacent to tribal lands? No

14. Location -

Congressional District: 12th

15. Location:

California State Senate District Number: 8

California Assembly District Number: 19

16. How many years of funding are you requesting? 3

17. Requested Funds:

a) Are your overhead rates different depending on whether funds are state or federal? Yes

If yes, list the different overhead rates and total requested funds: State Overhead Rate: 10

Total State Funds: 478,395

Federal Overhead Rate: 21.3

Total Federal Funds: 526,259

b) Do you have cost share partners already identified? Yes

If yes, list partners and amount contributed by each:

National Sea Grant College Program \$125,952.00

San Francisco Regional Water Quality Control Board - In Kind Support \$14,000.00

Multiple Organizations Participating on the Advisory Committee - In Kind Support \$27,000.00

c) Do you have potential cost share partners? No

d) Are you specifically seeking non-federal cost share funds through this solicitation? No

If the total non-federal cost share funds requested above does not match the total state funds requested in 17a, please explain the difference:

18. Is this proposal for next-phase funding of an ongoing project funded by CALFED? No

Have you previously received funding from CALFED for other projects not listed above?
Yes

If yes, identify project number(s), title(s) and CALFED program.

97C07 Preventing Introductions of Exotic Species from Ballast Water: the San Francisco Bay-Delta Ballast Management Education Program ERP

19. Is this proposal for next-phase funding of an ongoing project funded by CVPIA?

No

Have you previously received funding from CVPIA for other projects not listed above?

No

20. Is this proposal for next-phase funding of an ongoing project funded by an entity other than CALFED or CVPIA? No

21. Please list suggested reviewers for your proposal. (optional)

Name: James A Fawcett, PhD

Organization: Marine Transportation/Seaport Specialist, Sea Grant Program,
University of Southern California

Phone: (310) 740-4477
Email: fawcett@usc.edu

Name: Marc T. Braverman
Organization: Extension Specialist, Department of Human and Community
Development, University of California, Davis
Phone: (530)752-7003
Email: mtbraverman@ucdavis.edu

Name: Paul Heimowitz
Organization: Oregon Sea Grant
Phone: (503) 722-6718
Email: paul.heimowitz@orst.edu

Name: Paul Olin
Organization: California Sea Grant Marine Advisor
Phone: (707) 527-2621
Email: pgolin@ucdavis.edu

22. Comments:

Ecosystem Restoration Program - 2002 Proposal Solicitation Package (PSP): Form II – Executive Summary

The introduction of non-native species to the aquatic environment is an international problem that has resulted in significant ecological and economic impacts, and threats to human health. The prevention of the establishment of additional non-native species to the San Francisco Bay-Delta is listed as Goal 5 in the CalFed Bay-Delta Programs Draft Stage 1 Implementation Plan (August 6, 2001). The overall goal of the West Coast Ballast Outreach Project is to reduce the number of aquatic nuisance species (ANS) that are introduced to the west coast of the United States via ballast water discharges from merchant vessels. In February 1999, the University of California Sea Grant Extension Program initiated the West Coast Ballast Outreach Project to educate and promote cooperation between the major groups with an interest in ballast management and aquatic nuisance species (ANS) issues, including the maritime industry, regulators, and researchers. The initial 2.5 year project was supported by the National Sea Grant College Program and the CalFed Bay-Delta Program. In this proposal, we are seeking funds to continue this project for an additional three-year period, as ballast water treatment technologies and management strategies continue to evolve.

We will continue to work collaboratively with partnering organizations throughout the West Coast and Pacific basin in the development of outreach programs and tools about ANS and ballast water issues. Our approach will also facilitate communication and cooperation between private industry, regulators, and researchers concerned with ballast water management. The project advisory committee, comprised of industry, government, and environmental interests, will guide the specific content and may suggest modification of the project outcomes. Planned project outcomes include continuation of outreach materials, including the production and distribution of the biannual newsletter “Ballast Exchange,” the distribution of the “Stop Ballast Water Invasions” poster and brochure, and the continuation of the project web site. The proposed project will also feature the development of an “invited speaker seminar on ballast water” hosted at the California Maritime Academy and other workshops and meetings focusing on specific ballast management issues. The target area for this proposal is the San Francisco Bay-Delta region. This will be partnered with a regional approach, funded by the National Sea Grant College Program.

This extension of the West Coast Ballast Outreach Project will allow for continuation of this collaborative educational effort to mitigate ANS problems. By pooling resources and promoting coordination between researchers, the maritime industry, and state and federal trustee agencies, the project provides a truly inter-disciplinary venture and provides necessary augmentation and support of efforts to deal with the difficult issue of ballast water management. The West Coast Ballast Outreach Project is the ideal group to continue this mission since it has already established a multi-stakeholder network and effective partnerships with many of the involved organizations.

Ecosystem Restoration Program - 2002 Proposal Solicitation Package (PSP): Form III – Environmental Compliance Checklist

1. CEQA or NEPA Compliance

- a) Will this project require compliance with CEQA? No
- b) Will this project require compliance with NEPA? No
- c) If neither CEQA or NEPA compliance is required, please explain why compliance is not required for the actions in this proposal.

The proposed project is and education, outreach, and coordination project. There will be no field work conducted in this project.

2. If the project will require CEQA and/or NEPA compliance, identify the lead agency(ies). If not applicable, put "None".

CEQA Lead Agency: None

NEPA Lead Agency (or co-lead:) None

NEPA Co-Lead Agency (if applicable): None

3. Please check which type of CEQA/NEPA documentation is anticipated.

CEQA

-Categorical Exemption: None

-Negative Declaration or Mitigated Negative Declaration: None

-EIR: None

NEPA

-Categorical Exclusion: None

-Environmental Assessment/FONSI: None

-EIS: None

If you anticipate relying on either the Categorical Exemption or Categorical Exclusion for this project, please specifically identify the exemption and/or exclusion that you believe covers this project.

4. CEQA/NEPA Process

- a) Is the CEQA/NEPA process complete? Not Applicable
- b) If the CEQA/NEPA document has been completed, please list document name(s): Not Applicable

5. Environmental Permitting and Approvals *(If a permit is not required, leave both Required? and Obtained? check boxes blank.)*

LOCAL PERMITS AND APPROVALS

Conditional use permit

Variance

Subdivision Map Act

Grading Permit

General Plan Amendment
Specific Plan Approval
Rezone
Williamson Act Contract Cancellation
Other

STATE PERMITS AND APPROVALS

Scientific Collecting Permit
CESA Compliance: 2081
CESA Compliance: NCCP
1601/03
CWA 401 certification
Coastal Development Permit
Reclamation Board Approval
Notification of DPC or BCDC
Other

FEDERAL PERMITS AND APPROVALS

ESA Compliance Section 7 Consultation
ESA Compliance Section 10 Permit
Rivers and Harbors Act
CWA 404
Other

PERMISSION TO ACCESS PROPERTY

Permission to access city, county or other local agency land.
Agency Name:
Permission to access state land.
Agency Name:
Permission to access federal land.
Agency Name:
Permission to access private land.
Landowner Name:

6. Comments.

Ecosystem Restoration Program - 2002 Proposal Solicitation Package (PSP): Form IV - Land Use Checklist

1. Does the project involve land acquisition, either in fee or through a conservation easement? No

2. Will the applicant require access across public or private property that the applicant doesnot own to accomplish the activities in the proposal? No

3. Do the actions in the proposal involve physical changes in the land use? No

If you answered no to #3, explain what type of actions are involved in the proposal (i.e., research only, planning only).

The proposed project involves education, outreach, and coordination of programs.

4. Comments.

Ecosystem Restoration Program - 2002 Proposal Solicitation Package (PSP): Form V – Conflict of Interest Checklist

Please list below the full names and organizations of all individuals in the following categories:

- Applicants listed in the proposal who wrote the proposal, will be performing the tasks listed in the proposal or who will benefit financially if the proposal is funded.
- Subcontractors listed in the proposal who will perform some tasks listed in the proposal and will benefit financially if the proposal is funded.
- Individuals not listed in the proposal who helped with proposal development, for example by reviewing drafts, or by providing critical suggestions or ideas contained within the proposal.

The information provided on this form will be used to select appropriate and unbiased reviewers for your proposal.

Applicant(s):

Jodi Cassell, University of California Sea Grant Extension Program
Karen McDowell, University of California Sea Grant

Subcontractor(s):

Are specific subcontractors identified in this proposal? No

Helped with proposal development:

Are there persons who helped with proposal development? Yes

If yes, please list the name(s) and organization(s):

Name: Donna Nincic

Organization: California Maritime Academy

Comments:

Ecosystem Restoration Program - 2002 Proposal Solicitation Package (PSP): Form VI – Budget Summary

Being submitted separately in an excel spreadsheet entitled: ecosystemCalFedBudgetFormVICassellBalast

Year 1: October 1, 2002 - September 30, 2003 (State Funds:10% indirect costs)

Task	Direct Labor Hours	Salary	Benefits	Travel	Supplies & Expendables	Services or Consultants	Equipment	Other Direct Costs	Total Direct Costs	Indirect Costs	Total Costs
1	75%	\$24,075	\$7,223				\$0		\$31,298	\$3,130	\$34,428
2	75%	\$24,075	\$7,223	\$8,000		\$16,600	\$0		\$55,898	\$5,590	\$61,488
3	50%	\$16,050	\$4,815	\$7,000	\$11,500		\$0	\$6,000	\$45,366	\$4,537	\$49,902
											\$145,818

Year 2: October 1, 2003 - September 30, 2004 (State Funds:10% indirect costs)

Task	Direct Labor Hours	Salary	Benefits	Travel	Supplies & Expendables	Services or Consultants	Equipment	Other Direct Costs	Total Direct Costs	Indirect Costs	Total Costs
1	75%	\$26,475	\$7,943		\$2,000	\$12,000	\$0		\$48,418	\$4,842	\$53,260
2	75%	\$26,475	\$7,943	\$8,000		\$16,600	\$0		\$59,018	\$5,902	\$64,920
3	50%	\$17,650	\$5,295	\$7,000	\$3,500		\$0	\$6,000	\$39,446	\$3,945	\$43,390
											\$161,570

Year 3: October 1, 2004 - September 30, 2005 (State Funds:10% indirect costs)

Task	Direct Labor Hours	Salary	Benefits	Travel	Supplies & Expendables	Services or Consultants	Equipment	Other Direct Costs	Total Direct Costs	Indirect Costs	Total Costs
1	75%	\$28,950	\$8,685		\$2,000	\$12,000	\$0		\$51,636	\$5,164	\$56,799
2	75%	\$28,950	\$8,685	\$8,000		\$16,600	\$0		\$62,236	\$6,224	\$68,459
3	50%	\$19,300	\$5,790	\$7,000	\$3,500		\$0	\$6,000	\$41,591	\$4,159	\$45,750
											\$171,008

GRAND TOTAL = \$478,397

Ecosystem Resoration Program - 2002 Proposal Solicitation Package (PSP): Form VI - Budget Summary

Year 1: October 1, 2002 - September 30, 2003 (Federal Funds:21.3% indirect costs except rent and equipment over \$1500)

Task	Direct Labor Hours	Salary	Benefits	Travel	Supplies & Expendables	Services or Consultants	Equipment	Other Direct Costs	Total Direct Costs	Indirect Costs	Total Costs
1	75%	\$25,575	\$8,348		\$2,000	\$12,000	\$0		\$47,923	\$10,208	\$58,131
2	75%	\$30,075	\$8,348	\$8,000		\$16,600	\$0		\$63,023	\$13,424	\$76,447
3	50%	\$18,550	\$5,640	\$7,000	\$11,500		\$0	\$6,000	\$48,691	\$8,454	\$57,145
											\$191,723

Year 2: October 1, 2003 - September 30, 2004 (Federal Funds:21.3% indirect costs except rent and equipment over \$1500)

Task	Direct Labor Hours	Salary	Benefits	Travel	Supplies & Expendables	Services or Consultants	Equipment	Other Direct Costs	Total Direct Costs	Indirect Costs	Total Costs
1	75%	\$26,475	\$8,618		\$2,000	\$12,000	\$0		\$49,093	\$10,457	\$59,550
2	75%	\$30,975	\$8,618	\$8,000		\$9,100	\$0		\$56,694	\$12,076	\$68,770
3	50%	\$19,150	\$5,745	\$7,000	\$3,500		\$0	\$6,000	\$41,396	\$8,178	\$49,574
											\$177,893

Year 3: October 1, 2004 - September 30, 2005 (Federal Funds:21.3% indirect costs except rent and equipment over \$1500)

Task	Direct Labor Hours	Salary	Benefits	Travel	Supplies & Expendables	Services or Consultants	Equipment	Other Direct Costs	Total Direct Costs	Indirect Costs	Total Costs
1	75%	\$27,450	\$8,910		\$2,000	\$12,000	\$0		\$50,361	\$10,727	\$61,088
2	75%	\$31,950	\$8,910	\$8,000		\$9,100	\$0		\$57,961	\$12,346	\$70,306
3	50%	\$19,800	\$5,940	\$7,000	\$3,500		\$0	\$6,000	\$42,241	\$8,358	\$50,599
											\$181,993

GRAND TOTAL = \$551,609

Ecosystem Restoration Program - 2002 Proposal Solicitation Package (PSP): Form VII – Budget Justification

Direct Labor Hours. Provide estimated hours proposed for each individual.

Two Staff at Project Representative 1 (mid-point, non-union) for three years (Tasks 1, 2, & 3).

Salary:

Two Project Representatives (Tasks 1, 2, & 3):

Year 1: \$34,100 x 1 staff members	
\$40,100 x 1	= \$74,200/year
Year 2: \$35,300 x 1 staff members	
\$41,300 x 1	= \$76,600/year
Year 3: \$36,600 x 1 staff members	
\$42,600 x 1	= \$79,200/year

Benefits:

Two Project Representatives, Benefits = 30% of salary (Tasks 1, 2, & 3):

Year 1: \$22,260/year
Year 2: \$22,980/year
Year 3: \$23,760/year

Travel:

Invited Speaker Seminar Series (Task 2):

8 speakers/year, travel for 1 day and 1 night: \$1,000/speaker x 8 speakers/year = \$8,000/year

Project Staff (Task 3): Travel for project-sponsored events and to major meetings. It is essential that project staff attend project-sponsored events to help organize and run the meetings. Project staff must also attend pertinent meetings throughout the year to keep up to date on the latest information, and to present information about the project. One of these meetings includes the International Conference on Aquatic Invasive Species, and the Biannual International Marine Bioinvasions Conference. Travel for project staff will total \$7,000/year.

Supplies and Expendables:

Computers (Task 3): Two computers will be needed for the duration of the project, one for each staff member. The computers will only be used to update and create graphics for the project web site, maintain the database of contacts, and prepare project correspondence, evaluations, reports, and products. The total cost for the first year of the project will be \$6,000 (\$3,000/computer). There will be no cost for second and third year of the project.

Computer Accessories (Task 3): Computer printers, scanners, and new programs will be needed to complete project tasks. This is budgeted at \$2,000 for the first year of the program. There will be no cost for the second and third year of the project.

Office supplies, general postage, phones, copying, and computer maintenance (Task 3): Performance of the proposed activities, and distribution of project materials (i.e. educational poster and brochure) will require a high volume of communications with industry contracts, regulators and researchers located in California and throughout the United States. These costs have been budgeted at \$2,000/year.

General Mailing & Packaging (Task 3): The project will need to ship single and bulk quantities of project materials (newsletters, posters, and brochures) to stakeholders in the San Francisco Bay Delta Region. These costs have been budgeted at \$1,500/year.

Mailing and Packaging for Newsletter (Task 1b): The mailing and packaging costs for sending the biannual newsletter to individuals on the project mailing list will cost \$1,000 per issue. The amount budgeted for years 1,2, and 3 will be \$2,000, for a total of \$6,000 for the duration of the project.

Services or Consultants:

Graphics for Newsletter (Task 1b): Graphics for the biannual newsletter cost \$2,500 per issue. The amount budgeted for years 1, 2, and 3 will be \$5,000, for a total of \$15,000 for the duration of the project.

Printing for Newsletter (Task 1b): Printing for the biannual newsletter cost \$3,500 per issue. The amount budgeted for years 1, 2, and 3 will be \$7,000, for a total of \$21,000 for the duration of the project.

Video Production (Task 2): A video of each seminar series will be made and distributed. One seminar series will sponsored each year. The production of the video tapes will primarily done by consultants. These costs have been budgeted at \$15,000 for year 1, and \$7500 for years 2 and 3.

Honorarium (Task 2): An honorarium will be provided for each of the invited speakers at the seminar series. This is budgeted at \$200/speaker, with 8 speakers/year. The total comes to \$1,600/year.

Equipment:

No equipment over \$5000 will be acquired for this project.

Project Management:

The project will be overseen by the Project Director: Jodi Cassell, Marine Advisor, California Sea Grant Extension Program. Her salary is covered by California Sea Grant. In Addition, daily operation of the project will be run by the Project Coordinator: Karen Hart McDowell, California Sea Grant Extension Program. Her salary is covered by funding from the National Sea Grant College Program. Therefore there is no money budgeted for project management.

Other Direct Costs:

Office Space (Task 3): \$3,000 has been budgeted for office space in San Bruno for each year of the project. Both project staff will be housed in the San Bruno office.

Meeting Expenses (Task 3): The project will help sponsor ballast water advisory committee meetings, workshops, and/or teleconferences held in the San Francisco Bay Delta Region to help coordinate management activities. Cost for renting facilities, teleconferencing, video-conferencing, refreshments, and administering of workshop registration have been budgeted at \$3,000/year.

Indirect Costs:

The overhead rate for state funding is 10% on all direct costs. The overhead rate for federal funding is 21.3% on all direct costs, except for rent and equipment over \$1,500.

WEST COAST BALLAST OUTREACH PROJECT

PROJECT DESCRIPTION: Project Goals and Scope of Work

PROBLEM/BACKGROUND

Aquatic Nuisance Species

Introductions of nonindigenous aquatic nuisance species (ANS) have dramatically affected many West Coast ecosystems. Studies have shown that San Francisco Bay-Delta, for example, is dominated by more than 200 ANS, and that a new ANS is established in the system every twelve weeks (Cohen and Carlton, 1995). Documented impacts of ANS introductions include: 1) ecological changes, such as alterations to food webs and displacement of native species, 2) economic costs of removal and management of ANS, and 3) public and ecosystem health concerns from exposure to exotic pathogens (National Research Council, 1996). West Coast estuaries may be particularly susceptible to introduction of new species due to their relative geologic youth and low species diversity (Herbold and Moyle, 1989).

In recent years, a significant amount of research has documented the presence and impacts of ANS in the San Francisco Bay-Delta. Several species show impacts on the base food web. The Asian clam (*Potamocorbula amurensis*), thought to be introduced via ballast water, was first found in the San Francisco Bay-Delta in 1986 and has subsequently been recorded in densities of over 16,000 juveniles/square meter (Cohen and Carlton, 1995). With such high densities, this planktonic filter feeder may be damaging the base of the SF Bay's food web (Cohen and Carlton, 1995). At least eight copepod (zooplankton) species have been introduced to the San Francisco Bay-Delta, with ballast water being the most likely vector of introduction (Avent et al, 2000). The invasive copepods have dramatically changed the zooplankton communities in the estuary and delta over the past 20 years, with invasive species making up a significant component and sometimes the most abundant portion of the copepod communities (Orsi 1999; Bollens et al., 1999; and Kimmerer et al., 1999). As with the Asian Clam, these changes in the copepod community are changing the base of the food web, which may in turn have adverse effects on higher trophic levels such as fishes and birds.

Several of the ANS introduced into the San Francisco Bay-Delta, including the Chinese mitten crab and the European green crab, have caused economic impacts due to the significant cost of management and control programs. The Chinese mitten crab (*Eriocheir sinensis*), for example, transported in ballast water or intentionally introduced to create a fishery, have been found in large and growing numbers in San Francisco Bay-Delta. The mitten crab burrows into river banks and levees, which may contribute to erosion and costly restoration. The mitten crab can also impact and clog water diversions and industrial water intakes. The European green crab (*Carcinus maenas*), introduced unintentionally by the aquaculture industry, has been documented to cause a decrease in native clam and crab populations in some regions on California (Grosholz et al., 2000). In the year 2000, the ANS task force, under the authority of NISA 96, designated committees to create a national management plan for the Chinese mitten crab and the European green crab, in an effort to control the spread and decrease the negative impacts of these species.

The potential introduction of exotic pathogens and parasites into the San Francisco Bay-Delta poses potential public and ecosystem health concerns. A recent study revealed that 93% of the ships that were tested coming into Chesapeake Bay from foreign ports, carried the bacteria that causes the human epidemic cholera (Ruiz et al., 2000). Tests for the cholera bacteria have not been conducted on the west coast of the United States, but it does present a potential threat. The introduction of an exotic parasite could also decimate a native species, possibly driving the species to extinction. The threat of exotic pathogen and parasites is not well documented, but limited data shows the potential threat exists, and prevention is really the key to mitigating any potential impacts.

Ballast Water and Current Management Approaches

Ballast water in transoceanic ships is one of the primary vectors for the introduction of ANS to estuaries throughout the world. Ballast water is an essential part of normal ship operations, providing trim, stability, propeller immersion, and maintaining safe levels of hull stresses in various states of loading. As ballast water is adjusted and flushed into the waters of destination ports during loading and unloading, organisms in the water are also released into the ecosystem. Research by Carlton et al (1995) indicates that ships may carry as many as 500 species of plants and animals in their ballast water. Advances in shipbuilding technology, which have created larger and faster ships, have increased survival rates of transported species. In the year 2000, 2.1 million metric tons of foreign ballast water was discharged into the San Francisco Bay-Delta (Falkner, 2001), which presents significant opportunity for new ANS to invade. Once a species is established in a new area, it is very difficult to manage and nearly impossible to eliminate.

Ballast water is regulated from the federal to the local level. There is also potential for international regulation. At the federal level, the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 (NANPCA 90) mandated ballast water management for vessels entering the Great Lakes. Under the reauthorization of this law, the National Invasive Species Act of 1996 (NISA 96), the development of voluntary ballast management guidelines for all other ships entering U.S. waters is required. NISA 96 also calls for the USCG to evaluate the effectiveness of the voluntary ballast management program three years after implementation of the guidelines, which began in June 1999. If, at that time, it is determined that voluntary guidelines have not been effective, the law would require the implementation of a mandatory ballast management program for all ships in U.S. waters. In addition, NISA 96 is up for reauthorization in 2002.

Management of ballast water is also being pursued at the state level. California passed Assembly Bill 703 in October 1999, which requires open ocean exchange or treatment for all vessels wanting to discharge ballast water in a California port after operating outside of the Exclusive Economic Zone (EEZ). The law went into effect on January 1, 2000 and sunsets in January 2004. Additional requirements include the completion and submission of a Ballast Water Report Form and maintenance of a Ballast Water Management Plan prepared specifically for the vessel, which include safety and exchange procedures. Washington State passed Substitute House Bill 2466, which mandates ballast water exchange from vessels entering from outside the EEZ and also requires exchange for

coastal traffic, which is not presently required by the USCG or California programs. Since ballast exchange cannot always be accomplished safely, an exemption to the ballast water exchange requirement is provided in cases where weather or other conditions prevent exchange. However, after July 1, 2002, all ships will be required to exchange or treat their ballast water in Washington. Oregon is also in the process of passing a Senate Bill 895, which would require mandatory ballast water exchange for foreign and coastal traffic.

Currently, management strategies for preventing introductions via ballast water are limited to open ocean exchange, which flushes port of origin ballast water into the open ocean where the estuarine organisms are not likely to survive (NRC, 1996). The exchange efficiency has been documented to range from 75-95% of the water in various studies, usually depending on placement of intake and outflow pipes and tank configuration. Although open ocean exchange reduces the risk of invasion, exchanged water still poses a significant threat. The Great Lakes has experienced new introductions of ANS, even after the inception of a well-enforced mandatory ballast water exchange program. In addition, open ocean exchange is not the best solution for the west coast industry. Rough seas pose safety problems for ships exchanging ballast water and may frequently preclude open ocean exchange on the west coast where storms are frequent. Excessive bending moments and sheer stresses on the ship's hulls can result if exchange is attempted in waves exceeding the level of safety for ballast operations (NRC, 1996). In situations where rough seas could pose safety and ship stability problems, all regulatory programs allow for a safety exemption, which would allow a ship to discharge its ballast without conducting an open ocean exchange.

Due to the limitations of open ocean exchange, various organizations are developing ballast water treatment systems that will remove or kill the organisms before they are discharged from into the port. To date, no ballast water treatment system has been approved by a federal or state ballast water management program. Some of the most promising technologies include one or a combination of the following: UV irradiation, hydrocyclone/centrifugation, filtration, ozonation, and heat treatment. United States Coast Guard (USCG) is actively working to create a standard for ballast water treatment systems that could be adopted by federal and state regulatory programs. Researchers and regulators are currently working to create a standard testing protocol for ballast water treatment systems, so the different systems can be easily assessed and compared. A few experimental systems have been installed on ships and have undergone preliminary testing. These preliminary tests indicate that the systems are promising, but still need to be modified and vigorously tested before they can be approved for general use. Full-scale testing of ballast water treatment systems is an essential part of the development and approval process. Successful testing requires a cooperative effort between researchers, regulatory and ship owners. Increased involvement in these projects is necessary for the timely development of ballast water treatment technologies. Keeping the maritime industry updated on the latest developments in ballast water treatment technology and various incentive programs will increase their participation in the development of these products and enhance the rate of adoption of these technologies once they are approved.

Given the situation with evolving tools and technologies, there will be many changes in the international, federal, and state regulatory regime within the next three

years. The changes will focus around adopting treatment standards for ballast water treatment systems, and incorporating regulations for coastal traffic (which also pose a threat for transfer of ANS). Coordination of state, federal, and international ballast water regulations is essential if we want to succeed at significantly reducing the risk of invasion via ballast water. The maritime industry is an international industry, with the majority of merchant vessels being foreign flagged, and carrying multi-national crews. If rules and requirements change with every state and/or country, the crew will be confused and/or frustrated with the “patchwork regulatory regime,” which will result in a lower compliance rate. There is also potential for severe economic impacts to a port region if regulations and fees vary significantly between bordering countries or states. For example, if a restrictions are “too high” in one state/country, then a ship could easily divert its cargo to an adjacent state/country, potentially causing a severe economic hardship to the restricted region that is trying to protect its environment. And, once an organism establishes on the coastline, it is easier for that population to spread naturally or via other vectors. To avoid these problems, coordination of regulatory programs along the west coast of North America, and with other Federal and international programs is essential.

Past and Current Outreach Efforts

In February 1999, the California Sea Grant Extension Program initiated the West Coast Ballast Outreach Project to address some of the above management concerns. The first phase of this program was jointly funded by the CalFed Bay-Delta Program and the National Sea Grant Program. This dual funded approach allowed the project to focus education efforts on the San Francisco Bay-Delta, in addition to addressing regional concerns on the entire west coast. The West Coast Ballast Outreach Project represented the first collaborative effort with the west coast maritime industry to mitigate ANS problems.

The West Coast Ballast Outreach worked collaboratively with partnering organizations throughout the west coast and Pacific basin in the development of outreach programs and tools about ANS and ballast water issues. The project placed a priority on facilitating communication and cooperation between private industry, regulators, and researchers concerned with ballast water management. Some notable outcomes of the first phase of the West Coast Ballast Outreach Project include:

- **Production and distribution of three issues of the biannual newsletter “Ballast Exchange,” providing the latest information on ballast water treatment technologies, management strategies, and west coast ANS issues. This newsletter has a growing mailing list that includes over 2000 nationwide and international recipients.**
- **Design and distribution of the “Stop Ballast Water Invasions” poster and brochure, products designed to tell the ballast water story to a variety of audiences (including ships crews) through an appealing graphics-oriented poster and a more text-focused brochure. A total of 15,000 posters and 20,000 brochures were printed and are currently being distributed to domestic and international shipping companies, ports, and government executives. The poster was awarded first place in the "Posters, Flyers, T-shirts" category of the Natl. Assn. of Government Communicators 2001 awards program**

<http://www.nagc.com/awards/awards2001/win01.html>), and the US Coast Guard, the California State Lands Commission, and the Port of Long Beach contributed extra unplanned funds so that additional posters copies could be printed.

- **Sponsored nine educational workshops and one video-conference with Australia. The workshops included presentations on ballast water management and technology issues, and opportunities for interaction and discussion of such issues between the various stakeholders.**
- **Development and maintenance a project web site that is averaging 550 hits/month (<http://ballast-outreach-ucsdavis.edu>).**
- **Development of successful partnerships and collaborative programming with the major governmental agencies involved with ballast management including the U.S. Coast Guard and the California State Lands Commission.**

Widespread awareness of ANS and ballast management issues have increased in the west coast maritime industry over the past 2.5 years due in large part to the first phase of the West Coast Ballast Outreach Project. With all of the pending changes that are expected over the next three years, a continued education and coordination program is needed on the west coast of the United States. The National Sea Grant Program has funded the West Coast Ballast Outreach Project for an additional two-year period, beginning October 2001. This funding covers one staff member and the continuing education and coordination of ballast water management programs for California, Oregon, Washington, Alaska, and Hawaii. The funding also covers printing and distribution of the biannual newsletter (“Ballast Exchange”) and educational poster and brochures, the continuation of the project web site, and ballast water workshops. Additional funding will be needed to focus efforts in the San Francisco Bay-Delta region.

Another program that has an outreach and education component is the Global Ballast Water Management Program (GloBallast). The International Maritime Organization (IMO) joined forces with the Global Environment Facility (GEF), the United Nations Development Programme (UNDP), member countries, and the shipping industry to assist less-industrialized countries in tackling the ballast water problem. This three-year international program, established in May 2000, assists developing countries in implementing effective measures to prevent introductions via ballast water. The West Coast Ballast Outreach project has worked in cooperation with this international education and outreach program, allowing GloBallast to focus on the international issues, while the West Coast Ballast Outreach Project focuses on national, regional, and local issues.

Project Goals and Objectives

The ultimate goal of the West Coast Ballast Outreach Project is to reduce the number of ANS that are introduced to the west coast of the United States via ballast water discharges from merchant vessels. This goal is directly in-line with Goal 5 in the CalFed Bay-Delta Programs Draft State 1 Implementation Plan (August 6, 2001), referring to the prevention of the establishment of additional non-native species to the San Francisco Bay-Delta. The West Coast Ballast Outreach Project seeks to continue its unique approach, believing that, with education, the west coast

maritime industry will become part of the solution. The specific objectives of the West Coast Ballast Outreach Project are as follows:

1. To continue to improve knowledge and understanding of current ballast water management strategies and aquatic nuisance species (ANS) issues and among the maritime industry, regulators, researchers, and the general public in the San Francisco Bay-Delta region.
2. To coordinate ballast water management activities along the west coast, and with the federal and international programs.
3. To maintain open lines of communication and promote cooperation between private industry, regulators, and researchers concerned with ballast water management in the San Francisco Bay-Delta region.
4. To bolster industry interest and participation in ballast management issues, to set the stage for increased industry participation in ballast water treatment technology projects, and to enhance the potential for adoption of technologies and management strategies.

JUSTIFICATION

Creating awareness and coordinating activities will create a feedback loop that will allow for the development of successful management programs will increase industry involvement and compliance. By educating the maritime industry and regulators about developing ballast water management issues, we will increase their awareness and understanding of the issue. This will allow regulators to develop effective ballast water management programs that are coordinated from the local to the international level. The increased awareness of the maritime industry and the development of a coordinated ballast water management program will lead to an increased compliance rate. In addition, some companies will go a step farther and take a proactive role by participating in technology development projects and by participating in the development new regulatory programs. The increase in industry participation will lead to a rapid development of ballast water treatment technologies. Once ballast water treatment technologies are created, the regulatory programs can be redeveloped to incorporate these superior management techniques. The end result will be an effective management program with a high compliance rate, therefore significantly lowering the risk of invasion of ANS via ballast water.

The West Coast Ballast Outreach Project is the ideal group to continue this mission since it has already established a multi-stakeholder network and effective partnerships with many of the involved organizations during the first phase of the program. The West Coast Ballast Outreach Project was developed and administered by the University California Sea Grant Program. A major role of Sea Grant Extension is to provide objective technical information to marine and coastal resource users and managers. Sea Grant Extension has been in existence nationwide since 1968, and, among other things, conducts workshops and training seminars, produces targeted publications and videos, and develops websites and other media. UC Sea Grant Extension in the San

San Francisco Bay region currently places a major emphasis on developing outreach and information on ANS issues in the marine environment and Bay-Delta. We will utilize this expertise, as well as the Sea Grant model of outreach and communication, to continue the West Coast Ballast Outreach Project.

APPROACH

The West Coast Ballast Outreach Project is seeking to begin the second phase of its education, outreach, and coordination project in the San Francisco Bay-Delta area. This localized effort will be carried out simultaneously with the regional approach, which has already been funded by the National Sea Grant Program and is strongly supported by various stakeholders on the west coast. Educating the maritime industry, regulators, researchers, environmental groups, and the public on local ANS issues and recent developments in ballast water management, will increase compliance with current regulatory programs and encourage the stakeholders to work together to develop ballast water treatment technologies.

All activities of the West Coast Ballast Outreach Project will be shaped by our advisory committee, which will be maintained from the first phase of the project. This committee meets at least once per year and is made up of representatives from the maritime industry, regulatory agencies, environmental groups and universities. The advisory committee was a key component to the success this program achieved during its first 2.5 years. We currently have 25 core members, who have consistently attended meetings, and an additional 20 members that give us input via phone and e-mail communications. Frequent communication with the advisory committee allows us to gain quick feedback and adapt our education and outreach efforts as is necessary throughout the course of the project.

Our approach will be responsive to advisory committee input, however, we envision the following major program components in this proposed three-year extension of the project.

Task 1) Outreach Materials – These materials have been partially funded by the National Sea Grant College Program, through September 30, 2003. With the additional funding requested in this proposal, staff members will work to increase the distribution to the maritime industry, regulators, environmental groups, and the public in the San Francisco Bay-Delta region. In addition, project staff will work to develop special sections in the newsletter and the web page that would specifically highlight issues in the San Francisco Bay-Delta region.

a. Educational Posters and Brochures. We will expand distribution of the “Stop Ballast Water Invasions” poster and brochure that were developed during the first phase of this project. These products were designed to tell the ballast water story to a variety of audiences (including ships crews) through an appealing graphics-oriented poster and a more text-focused brochure. These brightly illustrated documents describe the potential impacts of ANS, give examples of ANS that have already caused impacts, and give tips on how to manage ballast water management and where to get more information. These documents have been well received by the various stakeholders involved in this issue. We have currently distributed over half of our original run of 15,000 posters and 20,000 brochures and we are still receiving many

requests from members of the shipping industry, regulators, researchers, and environmental groups. We have received additional funding from the National Sea Grant Program to print an additional 20,000 updated brochures, and 15,000 updated posters.

b. Biannual Newsletter, “Ballast Exchange.” We will highlight San Francisco Bay-Delta regional issues in the twelve-page biannual newsletter, which provides the latest information on ballast water treatment technologies, management strategies, and west coast ANS issues. The newsletter is the first of its kind to focus mainly on ballast management issues. Since this newsletter contains articles written from environmental groups, the maritime industry, regulators, researchers, and project staff, it allows our readers to view these issues from the various perspectives. The newsletter will continue to provide updates on developments in state, federal, and international regulations. This newsletter has a growing mailing list that includes over 2000 nationwide and international recipients, with an additional 3000 issues distributed at conferences and workshops. We will continue to produce the newsletter for the duration of the proposed project. The funds in this project will cover all costs for the three years of the project.

c. West Coast Ballast Outreach Web Site: <http://ballast-outreach-ucsgep.ucdavis.edu>. We will continue to maintain and update the project web site to inform people of recent developments in ballast water management in a timely fashion. The web site includes the following sections: Project Background and Information, Educational Poster and Brochure, Newsletter, Articles and Books, Links for Information, Coming Events, Laws and Policies, What’s New, and Contact Us. The first four sections provide background and information on ballast water issues. The final five sections allow people to find out what is currently going on by providing information and/or links to coming events, laws and policies, news articles, press releases, and draft reports. The web site allows us to increase awareness of our educational materials, sponsored workshops, and project activities. With the proposed funding we will be able to include a section that focuses specifically on the San Francisco Bay-Delta region.

2) California Maritime Ballast Water Seminars. The West Coast Ballast Outreach Project will work together with the California Maritime Academy (CMA) to sponsor an invited speaker seminar series focusing on ballast management and technology. The invited speaker seminar will be open to CMA students, as well as the local maritime industry, regulators, and the public. There will be no charge for participants attending the seminars. The speakers will be a combination of local and national ballast water experts representing the maritime industry, researchers, and the various regulatory agencies. The seminar series would be offered once a year, with approximately 8 invited speaker seminars being offered over a 16-week period. This program would allow the cadets and local members of the maritime community to interact with members from the maritime industry who have taken a pro-active approach to the ballast water issue. This is also a rare opportunity to teach and interact with individuals who will be working on ships and directly involved with ballast water operations.

At the end of each seminar, a summary will be posted on the project web site, so that people that were unable to attend the seminar would still have access to the information. In addition, a video will be made of the first seminar series, incorporating all speakers, to create an overview of the most recent developments in ballast water management. These videos will be distributed to the local stakeholders involved in this issue. In addition, the video could be used at other maritime academies. During years 2 and 3 of the seminar series, we expect to have some repeat speakers in the series, so we have budgeted to tape only half (6) of the seminars for each of these years.

CMA is an ideal partner since it is located in Vallejo, California, and is one of the leading programs for individuals seeking a career in the maritime industry. CMA currently has over 500 cadets enrolled in the program, and at least 1/3 of the graduates go on to work in the San Francisco Bay-Delta region.

3) General Outreach and Workshops. The West Coast Ballast Outreach Project will continue general outreach efforts in the San Francisco Bay-Delta Region. The project will also sponsor local workshops and teleconferences on specific ballast water issues on an “as needed” basis, which will be determined by the advisory committee. Project staff will also attend local and national meetings on the ballast management to stay current on the latest developments. Staff members will also continue working on important cooperative efforts. We will also continue to work very closely with the Western Regional Panel on Aquatic Nuisance Species (WRP), the ANS Task Force, and other important committees and organizations.

FEASIBILITY

This period of ballast water technology development and regulatory change, is the ideal time to continue education, outreach, and coordination in this area. The three-year time frame is appropriate for this project. Over the next three years, it is expected that various regulatory programs will set ballast water treatment standards and adopt an approval system for specific treatment systems. The entire process of having ballast water treatment systems on the majority of ships is going to take many years, but the key time for education and coordination is during the early development of these programs.

The results from the first phase (February 1999 through September 2001) of the West Ballast Outreach Project have shown that this approach works. We continue to receive repeated requests for our newsletter, poster, and brochures. We are also receiving a high amount of traffic on our project web site where we inform the stakeholders of new developments and materials and updated information about ballast water regulations and research. We plan on expanding this network as the project continues.

Information and awareness amongst the stakeholders has increased participation in ballast water management planning. Most recently, over 30 people attended a public comment session sponsored by the U.S. Coast Guard, on the future national ballast water management regulations. Most of the participants had attended the ballast water meeting on June 4-5th in Vallejo, California, and they were planning on submitting written comments to the U.S. Coast Guard about the future of ballast water management. The participation of the local maritime industry, state regulators, and environmental groups in these types of events is crucial to creating an effective ballast water management program. There continues to be high attendance at project sponsored ballast water

meetings. The latest meeting in Vallejo, California on June 4-5th, 2001 had more than 70 participants representing the various stakeholders involved in the ballast water issue. Most importantly we have established a strong network with the various stakeholders involved in the ballast water issue in the San Francisco Bay-Delta area, along the west coast, and throughout the world. People know that they can contact us to get educational

PERFORMANCE MEASURES

Performance measures to evaluate the effectiveness of this outreach program will be tracked throughout the course of the project. Specific measures to be tracked, in accordance with the project objectives, include:

- *Performance Measure 1 (direct)*. Participation in and use of educational programs
- *Performance Measure 2 (direct)*. Changes in knowledge level and awareness of ANS issues among program participants.
- *Performance Measure 3 (direct)*. Impact of education programs on coordination, communication, and cooperation among interest groups.
- *Performance Measure 4 (indirect)*. Impact of education programs on ballast management practices.

In accordance with the literature on evaluation of similar educational and awareness “campaigns”, we conceptualize performance measures 1, 2, and 3 as smaller, discrete indicators/impacts which may be directly evaluated based on separate project activities (Flay, BR, Kessler, RC, & Utts, J, 1991). Although we will attempt to measure performance measure 4 within some of the project components, ballast management practices are also related to factors outside the project domain, including the implementation of state regulatory programs. Thus, while we will ultimately conceptualize the implementation of ballast management practices to *related* to the success of this overall education effort, we wish to acknowledge the difficulties with evaluating performance measure 4 in terms of this project. Thus, this measurement is listed as “indirect”. The evaluation plan for specific project components is outlined below.

1) Poster/Brochure. The primary goal of the project poster/brochure is to increase awareness of ballast management issues and of opportunities to participate in the West Coast Ballast Outreach Project. The poster was also specially designed to provide a colorful, picture-oriented overview of the ballast issue to ships crews who may be multi-ethnic and often do not speak or read English. Evaluation of this project component will focus on performance measures 1 and 2.

Evaluation Plan. The poster/brochure evaluation will proceed on three fronts. First, general feedback on poster/brochure use and resulting changes in ANS knowledge/awareness will be obtained as part of the newsletter survey (below). Second, we will directly evaluate the use of the poster aboard ships via a presence/absence survey (in terms of presence of the poster on the ships bridge or in another common location) in coordination with major harbor pilots associations and via a more detailed series of face-to-face shipboard interviews with ships crews and captains. We foresee language barriers as a potential problem with conducting onboard interviews, and thus we have allocated additional funds in the project budget for translation services. We see shipboard

interviews and the extra allocation of funds for this section of the evaluation as important in allowing us to better understand the ships crews as a clientele group. The survey will provide us with social, demographic, and needs assessment information which not otherwise available for this group. Finally, we will also cross tabulate the presence-absence survey and shipboard interview data with the individual ship ballast management records to assess the relationship between the use of the project poster and ballast management practices.

2) “Ballast Exchange” Newsletter. The biannual project newsletter is seen as a tool to increase awareness of West Coast ANS issues, facilitate cooperation and communication on ballast-related activities, and to publicize ANS events. Evaluation of this project component will focus on performance measures 1, 2, and 3, and will, to a lesser degree, address performance measure 4.

Evaluation Plan. At the outset of this second phase of the CalFed West Coast Ballast Outreach Project, we will undertake an overall survey of our mailing list (numbering approximately 2000 individuals/organizations) utilizing the project newsletter as the survey vehicle. A two page survey will be mailed out as an insert in the project newsletter, which will focus on evaluation of the newsletter, poster/brochure, and website.

3) Project Website. The project website serves as a medium for increasing awareness of West Coast ANS issues, facilitating information exchange and cooperation, and publicizing events. Evaluation of this project component will focus on performance measures 1, 2, and 3, and will, to a lesser degree, address performance measure 4.

Evaluation Plan. In addition to the newsletter survey, above, we will maintain the “feedback” page on the project which allows for continual input to and evaluation of the website.

4) Cal-Maritime Ballast Seminars. The primary goals of the Cal-Maritime seminars will be to increase the awareness of academy cadets about ANS and ballast management. Evaluation of this project component will focus on performance measures 1 and 2.

Evaluation Plan. We will randomly survey individual seminar groups utilizing a pre- and post-seminar ANS knowledge survey to assess the educational value of programs. We will also track and record numbers, names, and affiliations of seminar participants.

5) Project Workshops. Project workshops will be designed and implemented to address needs for information and coordination around specific ballast management issues. As such, Evaluation of this project component will focus on performance measures 1, 2, and 3, and will, to a lesser degree, address performance measure 4.

Evaluation Plan. We will randomly survey individual workshop groups utilizing a pre- and post-seminar ANS knowledge survey to assess the educational value of programs. We will also include survey question which address the impact of workshops on coordination/cooperation, and implementation of ballast water regulations. We will track and record numbers, names, and affiliations of workshop participants.

In summary, this evaluation plan will gauge project performance by looking at a number of measures ranging from breadth of dissemination to awareness and knowledge

shifts. We will also tie these measures to changes in ballast management practices in as much as is feasible and realistic. We will post all findings in a special section of the project web page, and also expect to present project information and evaluation findings at relevant conferences and meetings. Finally, we will work with our existing project advisory committee and project staff to make any necessary modifications to this evaluation strategy during the course of the project.

DATA HANDLING AND STORAGE

Since this is an education, outreach, and coordination project, there will be no significant data generated by this project. All project events and materials will be posted on the project web site, and within the project newsletter.

EXPECTED PRODUCTS AND OUTCOMES

- Produce and distribute 6 issues of the 12-page project newsletter, “Ballast Exchange.”
- Continued distribution of the “Stop Ballast Water Invasions” poster and brochure.
- Ballast water information posted on project web page.
- Sponsorship of the Annual Invited Speaker Seminar Series on ballast water at the California Maritime Academy in Vallejo (8 seminars/year).
- Production and distribution of 3 educational videos created from the Invited Speaker Seminar on ballast water.
- Attendance and presentation of materials annually at International Conference on Aquatic Nuisance Species.
- Attendance and presentation of materials at the biannual International Conference on Marine Bioinvasions.
- Other specialized ballast water workshops and/or teleconferences will be sponsored at the request of the advisory committee.

WORK SCHEDULE

All components of the project will be carried out for the duration of the project. The start date for all tasks will be October 1, 2003, and the end date will be September 30, 2006. Specific landmarks for some tasks will take place over the duration of the project. These landmarks are described below. Evaluation and project management are included within each separate task listed below and the following work schedule summary.

Task 1: Outreach Materials

The educational poster and brochure, “Stop Ballast Water Invasions,” will be distributed throughout the duration of the project. The project web site will be updated and maintained during the duration of the project. There will be no specific milestones in association with these two portions of task number one. The biannual newsletter will be produced two times per year, beginning in the fall of 2003 and ending in Spring 2006. The newsletters will be distributed to the mailing list immediately after printing, and then distributed to other parties and at conferences during the duration of the project.

Funding for this task consists of staff time and newsletter printing costs for the duration of the project. Funding for 75% staff time would need to be obtained over the

duration of the project. Funding for each newsletter would be needed at the by the following dates: October 1, 2003 for the Fall 2003 issue, January 1, 2004 for the Spring 2004 issue, October 1, 2004 for the Fall 2004 issue, January 1, 2005 for the Spring 2005, October 1, 2005 for the Fall 2005 issue, and January 1, 2006 for the Spring 2006 issue. Each issue is budgeted \$7,000, not including staff time.

Task 2: Ballast Water Course and Seminar

The invited speaker seminar series will take place once a year. The first series will take place in the fall of 2003. Subsequent series will take place in the fall of 2004 and the fall of 2005. Summaries of the seminars will be posted on the project web site by the following spring. The video of the first seminar series will be completed in fall of 2003, with the subsequent videos being completed in fall of 2005 and spring of 2006.

Funding for this task can be divided between staff time, the seminar series, and the video production. Funding for 75% staff time would need to be obtained over the duration of the project. Funding for the seminar series would need to be funded at the beginning of each year: October 1, 2003 for the first series, October 1, 2004 for the second series, and October 1, 2005 for the third series. The series for year 1 is budgeted at \$16,600, not including staff time, and \$9100 for years 2 and 3.

Task 3: General Outreach and Meetings.

General outreach and meeting will occur over the duration of the project. Due to the need to time meetings and workshops with developing issues, specific events have not been identified. The advisory committee will play a crucial role in determining the timing, location and specialized topic for any workshops and teleconference. The advisory committee meeting will meet in person 1-2 times each year. Additional teleconferences will be held as needed. The project staff will maintain constant communication with the advisory committee via e-mail and telephone.

Funding for this task consists of staff time over the duration of the project, supplies and expendables, rent, and staff travel. Funding for each of these items will need to be obtained at the beginning of each year of the project, as outlined in the budget. The funding of this task is essential for the operation of task #1 and task #2.

Work Schedule Summary

Task 1b (Ballast Exchange Newsletter) and Task 2 (Invited Speaker Seminar) will have specific landmarks over the duration of the project (listed below), but all tasks require work throughout the duration of the project, starting October 1, 2002 and ending September 30, 2005.

FALL 2003

- Ballast Exchange Fall 2003 edition (Task 1b)
- Invited Speaker Seminar Series #1 on BW at CMA (Task 2)
- Advisory Committee Meeting (Task 3)
- Distribution of the education materials, update to the web site, and general outreach/meetings will take place over the duration of the project. (Tasks 1a, 1c, & 3)
- Develop and implement project newsletter evaluation survey (Task 1)
- Evaluation of Speaker Seminar #1 (Task 2)

- Quarterly project reporting 1 & 2 (Task 1,2, & 3)

SPRING 2004

- Ballast Exchange Spring 2004 edition (Task 1b)
- Summary of Invited Speaker Seminar Series #1 posted on the project web site (Task 2)
- Distribution of the education materials, update to the web site, and general outreach/meetings will take place over the duration of the project. (Tasks 1a, 1c, & 3)
- Initiate presence/absence survey with Harbor Pilots and begin implementation of shipboard surveys (Task 1a)
- Quarterly project reporting 3 & 4 (Task 1,2, & 3)

FALL 2004

- Ballast Exchange Fall 2004 edition (Task 1b)
- Invited Speaker Seminar #2 on BW at CMA (Task 2)
- Distribution of video from the Invited Speaker Seminar #1 (Task 2)
- Advisory Committee Meeting (Task 3)
- Distribution of the education materials, update to the web site, and general outreach/meetings will take place over the duration of the project. (Tasks 1a, 1c, & 3)
- Random evaluation of project workshops (Task 3)
- Quarterly project reporting 5 & 6 (Task 1,2, & 3)

SPRING 2005

- Ballast Exchange Spring 2005 edition (Task 1b)
- Summary of Invited Speaker Seminar Series #2 posted on the project web site (Task 2)
- Distribution of the education materials, update to the web site, and general outreach/meetings will take place over the duration of the project. (Tasks 1a, 1c, & 3)
- Publicize evaluation results on the web and present at conference (Task 1,2 & 3)
- Quarterly project reporting 7 & 8 (Task 1,2, & 3)

FALL 2005

- Ballast Exchange Fall 2005 edition (Task 1b)
- Invited Speaker Seminar #3 on BW at CMA (Task 2)
- Distribution of video from the Invited Speaker Seminar #2 (Task 2)
- Advisory Committee Meeting (Task 3)
- Distribution of the education materials, update to the web site, and general outreach/meetings will take place over the duration of the project. (Tasks 1a, 1c, & 3)
- Evaluation of Speaker Seminar #3 (Task 2)
- Quarterly project reporting 9 & 10 (Task 1,2, & 3)

SPRING 2006

- Ballast Exchange Spring 2006 edition (Task 1b)
- Summary of Invited Speaker Seminar Series #3 posted on the project web site (Task 2)
- Distribution of video from the Invited Speaker Seminar #3 (Task 2)

- Distribution of the education materials, update to the web site, and general outreach/meetings will take place over the duration of the project. (Tasks 1a, 1c, & 3)
- Random evaluation of project workshops (Task 3)
- Final summary of project evaluation results (Task 1, 2, & 3)
- Quarterly project reporting 11 & 12, and Final Project Report (Task 1,2, & 3)

APPLICABILITY TO CALFED ERP AND SCIENCE PROGRAM GOALS AND IMPLEMENTAION PLAN AND CVPIA PRIORITIES

ERP, SCIENCE PROGRAM AND CVPIA PROIORITES

The goal of this project is directly in-line with Goal 5 in the CalFed Bay-Delta Programs Draft Sate 1 Implementation Plan (August 6, 2001), referring to the prevention of the establishment of additional non-native species to the San Francisco Bay-Delta. Non-native species (also referred to as ANS) are introduced to the San Francisco Bay-Delta by a variety of vectors. The best way to prevent new introductions is by addressing each of the possible vectors of introduction. Due to the increase in international trade and advances in shipbuilding technology ballast water is considered one of the primary vectors of introduction of ANS.

The ultimate goal of the West Coast Ballast Outreach Project is to reduce the number of ANS that are introduced to the west coast of the United States via ballast water discharges from merchant vessels. The project will achieve its goal through education, outreach, and coordination.

RELATIONSHIP TO OTHER ECOSYSTEM RESTORATION PROJECTS

The goal of this project is to work together with other projects involving ANS prevention and control. We will help disseminate the results of any pertinent ballast water or ANS research project, including projects funded by the CalFed Bay-Delta Program. We will also coordinate with other education and prevention programs, such as the RIDNIS program, which is run by Dr. Ted Grosholz at U.C. Davis, and funded by the CalFed Bay-Delta program. The RIDNIS project focuses on non-ballast water vectors. We have worked with this project to share ideas and coordinate outreach efforts.

REQUESTS FOR NEXT PHASE FUNDING

The West Coast Ballast Outreach project was funded by the CalFed Bay-Delta Program from February 1999 through August 2001. Since this is an education and outreach project and not a restoration project that is directed towards a targeted piece of property, the past efforts of this project will be listed under "Previous CalFed Funding."

PREVIOUS CALFED FUNDING

The West Coast Ballast Outreach Project (Title: Preventing the Introduction of Exotic Species from Ballast Water: the San Francisco Bay-Delta Ballast Management Education Program/ Project Number: 97C07/ Program: ERP) was funded by CalFed Bay-Delta Program from February 1999 through August 2001. Additional funding to support

this project was provided by the National Sea Grant College program from February 1999 through January 2001, and from October 2001 through September 2003. All project accomplishments (including portions funded by the National Sea Grant College Program) are included in the list below.

List of Accomplishments

Bi-annual Newsletter, “Ballast Exchange” – Over the duration of the project we produced and distributed three issues of the biannual newsletter “Ballast Exchange,” providing the latest information on ballast water treatment technologies, management strategies, and west coast ANS issues. This newsletter has a growing mailing list that includes over 2000 nationwide and international recipients. An additional 3000 copies of each issue have been distributed at conference and workshops.

“Stop Ballast Water Invasions” Poster and Brochure – These educational materials were developed, printed and distributed. These products were designed to tell the ballast water story to a variety of audiences (including ships crews) through an appealing graphics-oriented poster and a more text-focused brochure. The brightly illustrated documents describe the potential impacts of ANS, give examples of ANS that have already caused impacts, and give tips on how to manage ballast water management and where to get more information. They been well received by the various stakeholders involved in this issue. A total of 15,000 posters and 20,000 brochures were printed. The majority of these copies were distributed to domestic and international shipping companies, ports, and government executives. The poster was awarded first place in the "Posters, Flyers, T-shirts" category of the Natl. Assn. of Government Communicators 2001 awards program (<http://www.nagc.com/awards/awards2001/win01.html>), and the US Coast Guard, the California State Lands Commission, and the Port of Long Beach contributed extra unplanned funds so that additional posters copies could be printed.

Ballast Water Forums – We sponsored nine educational workshops and one video-conference with Australia. The workshops included presentations on ballast water management and technology issues, and opportunities for interaction and discussion of such issues between the various stakeholders.

West Coast Ballast Outreach Web Site: <http://ballast-outreach-ucsgep.ucdavis.edu> - We developed and maintained the project web site to inform people of recent developments in ballast water management in a timely fashion. The web site includes the following sections: Project Background and Information, Educational Poster and Brochure, Newsletter, Articles and Books, Links for Information, Coming Events, Laws and Policies, What’s New, and Contact Us. The first four sections provide background and information on ballast water issues. The final five sections allow people to find out what is currently going on by providing information and/or links to coming events, laws and policies, news articles, press releases, and draft reports.

Development of Multi-stakeholder Working Groups – We developed successful partnerships and collaborative programming with the major governmental agencies involved with ballast management including the U.S. Coast Guard and the California State Lands Commission. We also formed a network within the maritime community. Many of the key members of these groups participated in our advisory committee meeting to develop project products.

SYSTEMWIDE ECOSYSTEM BENEFITS

The primary goal of this project is the prevention of introduction of ANS. This is the most efficient way to curtail the invasive species problem. Controlling species once they are established is a much more expensive and time-consuming task. Prevention of new ANS will benefit the entire ecosystem, especially other restoration projects which might be prime locations for new ANS to establish and spread.

This project is targeted for the San Francisco Bay Delta region, but will also focus on the regional approach with funding from the National Sea Grant College program. Once species establish on the west coast it is much easier for them to establish in the Bay-Delta via other vectors or by natural dispersal techniques. Preventing the establishment on ANS along the west coast will also protect the San Francisco Bay-Delta region.

QUALIFICATIONS

Overall implementation of the project tasks will be managed by the California Sea Grant Extension Program. Jodi Cassell, a Marine Advisor at the California Sea Grant Extension Program, will serve as Project Leader, assuming overall responsibility for all project activities. Her salary support is provided through state Sea Grant funding, therefore is not included in this request. Ms. Cassell will devote approximately 25% effort to project management and project activities.

Karen Hart McDowell, or an individual with similar education and experience will act as the Project Coordinator for the West Coast Ballast Outreach Project. Dr. McDowell will devote 100% effort towards the project, focusing on the regional efforts and overseeing the efforts of the project staff for the CalFed Bay-Delta region. Dr. McDowell will be responsible for managing all project tasks, under the supervision of Ms. Cassell. Dr. McDowell salary will be covered by National Sea Grant College Program, therefore is not included in this request. In addition, two staff members to complete the tasks listed in this proposal.

Brief biographical sketches of the Program Director and Project Coordinator are included below:

JODI L. CASSELL

EDUCATION:

B.A. Harvard University, Biology, 1988.

M.S. Oregon State University, Marine Resource Management, 1992.

POSITIONS:

Marine Science Field Instructor, Newfound Harbor Marine Institute/Catalina Island Marine Institute/Jekyll Island Marine and Environmental Education Program, 1988-89; Research Assistant and Teaching Assistant, Oregon State University, 1989-91; Technical Assistant, University of Oregon Micronesia Program, 1991; Dean J. Knauss Sea Grant Marine Policy Fellow, U.S. Senate, 1992-93; Program Officer for Marine Conservation, World Wildlife Fund, 1993-94; Marine Advisor, San Francisco and San Mateo Counties, California Sea Grant Extension Program, 1995 to present.

SELECTED PUBLICATIONS

- 1) Cassell, J., K.H. McDowell, and J. Patton. 2000. *Stop Ballast Water Invasions* (poster). West Coast Ballast Outreach Project, San Bruno, CA.
- 2) Cassell, J., K.H. McDowell, and J. Patton. 2000. *Stop Ballast Water Invasions* (brochure). West Coast Ballast Outreach Project, San Bruno, CA.
- 3) Cassell, J., and K.H. McDowell. 2000. *Ballast Exchange* (newsletter), Volume 3. West Coast Ballast Outreach Project, San Bruno, CA.
- 4) Cassell, J., and K.D. Hart. 2000. *Ballast Exchange* (newsletter), Volume 2. West Coast Ballast Outreach Project, San Bruno, CA.
- 5) Cassell, J., and K.D. Hart. 1999. *Ballast Exchange* (newsletter), Volume 1. West Coast Ballast Outreach Project, San Bruno, CA.
- 6) Cassell, J. 1997. *Keep California Zebra Mussel Free* (brochure). Department of Water Resources, Sacramento, CA.
- 7) Cassell, J. and K. Schroeder, 1997. *Steelhead and Coho Salmon Fact Sheet*. University of California Cooperative Extension/California Sea Grant Extension Program, San Bruno, CA.
- 8) Cassell, J. and C. Carpenter, 1996. *Conflicts of Interest: An Issue for Management of U.S. Marine Fisheries?* World Wildlife Fund: Washington, D.C.
- 9) Cassell, J., Adelbai, and D. Otobed, 1992. *A Comprehensive Conservation Strategy for the Republic of Palau*. South Pacific Regional Environmental Program, Western Samoa.

KAREN HART MCDOWELL

EDUCATION:

- B.A. University of California at Santa Cruz, Biology (honors), 1990.
Ph.D. Florida Institute of Technology, Biology, 1997.

POSITIONS:

Assistant Animal Technician, University of California at Santa Cruz, 1988-1991;
Research Assistant and Teaching Assistant, Florida Institute of Technology 1991-1997;
Project Coordinator, West Coast Ballast Outreach Project, California Sea Grant Extension Program, 1999-present.

SELECTED PUBLICATIONS

- 1) McDowell, K.H. 2000. *Princess Cruises Tests the Optimar Ballast Water Treatment System on the Regal Princess*. Ballast Exchange, vol. 3. West Coast Ballast Outreach Project, San Bruno, CA.
- 2) McDowell, K.H. and S. Raaymakers. 2000. *The Global Ballast Water Management Programme*. Ballast Exchange, vol. 3. West Coast Ballast Outreach Project, San Bruno, CA.
- 3) Cassell, J., K.H. McDowell, and J. Patton. 2000. *Stop Ballast Water Invasions* (poster). West Coast Ballast Outreach Project, San Bruno, CA.
- 4) Cassell, J., K.H. McDowell, and J. Patton. 2000. *Stop Ballast Water Invasions* (brochure). West Coast Ballast Outreach Project, San Bruno, CA.
- 5) Cassell, J., and K.H. McDowell. 2000. *Ballast Exchange* (newsletter), Volume 3. West Coast Ballast Outreach Project, San Bruno, CA.

- 6) Cassell, J., and K.D. Hart. 2000. *Ballast Exchange* (newsletter), Volume 2. West Coast Ballast Outreach Project, San Bruno, CA.
- 7) Cassell, J., and K.D. Hart. 1999. *Ballast Exchange* (newsletter), Volume 1. West Coast Ballast Outreach Project, San Bruno, CA.

COST

BUDGET – see forms.

COST-SHARING

The National Sea Grant College Program has approved funds for the West Coast Ballast Outreach Project to continue its regional education, outreach, and coordination efforts. This funding has been approved for two years, starting in October 2001. The National Sea Grant Program will provide \$252,378 for the duration of the project. Matching funds were also provided in conjunction with the National Sea Grant Program. The matching funds come to a total of \$131,300 for the two-year duration. The primary contributors to the matching funds include the San Francisco Regional Water Quality Control Board, the Pacific Merchant Shipping Association, the Port of Oakland, the Port of Long Beach, and the California State Lands Commission.

LOCAL INVOLVEMENT

The primary goal of the West Coast Ballast Outreach project is education and coordination. The project has already established a strong network with local maritime industry representatives, regulators, environmental groups, and the public. This network will be maintained and expanded over the duration of the project. Some of the primary groups that we have worked with in the past include the Pacific Merchant Shipping Association, the Port of Oakland, the Port of San Francisco, the Port of Stockton, the Port of Sacramento, the California Association of Port Authorities, the California State Lands Commission, the U.S. Coast Guard, the San Francisco Regional Water Quality Control Board, the San Francisco Estuary Project, and the Ocean Conservancy (formerly known as the Center for Marine Conservation).

COMPLIANCE WITH STANDARD TERMS AND CONDITIONS

See cover letter faxed with signature page.

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- National Research Council. 1996. *Stemming the Tide: Controlling the Introductions of Nonindigenous Species by Ship's Ballast Water.* Washington, D.C., National Academy Press.
- Orsi, J.J. 1999. *Long-term trends in mysid shrimp and zooplankton.* IEP Newsletter 12(2), pp. 13-16
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